Air resistance

An object of mass m, moving along the horizontal axis (in the positive direction) with velocity **v** is slowed by a force of F=k**v**, where the k is a constant. At time t=0, the object has a velocity **Vo** at position x =0, as shown.

- **Vo** +

F=k**v**

1. What is the initial acceleration (magnitude and direction) produced by the resistance force?
2. Derive an equation for the object’s velocity as a function of time t, and sketch this function on the axis below. Let a velocity directed to the right be considered positive.

Vo

0

time

-Vo

1. Derive an expression for the distance the object travels as a function of time t and sketch this function on the axes below.

X

0

time

1. Determine the distance the object travels from t=0 to t=infinite.